FRAZIER MOUNTAIN FUELS REDUCTION PROJECT

Environmental Assessment OR-035-01-15

Introduction: The Vale District Bureau of Land Management, Baker Resource Area proposes the treatment of approximately 200 acres of BLM-administered lands within the Frazier Mountain area, located approximately 9 air miles Southeast of Union, Oregon. The legal description of the project area is as follows: Township 5 South, Range 41 East, Sections 30, 32, and 33; and Township 6 South, Range 41 East, Section 5. The proposed actions are designed to address fuel-loading concerns within the project area and include the use of prescribed fire (including pile burning), pre-commercial and commercial thinning. Standing dead and dead and down trees, as well as some green trees, would be subject to pre-commercial and/or commercial thinning, and would be either removed from the project site or piled and burned on site. The treatment area would be burned by prescription where fuel loadings and types would sustain an effective burn.

Proposed Action:	The Baker Field Office of the Vale District, BLM proposes to remove excessive fuels in the Frazier Mountain Area on lands administered by the BLM.
Type of Statement:	Environmental Assessment (EA)
Agency:	Bureau of Land Management, Department of Interior
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1.0 Purpose of and Need for Action

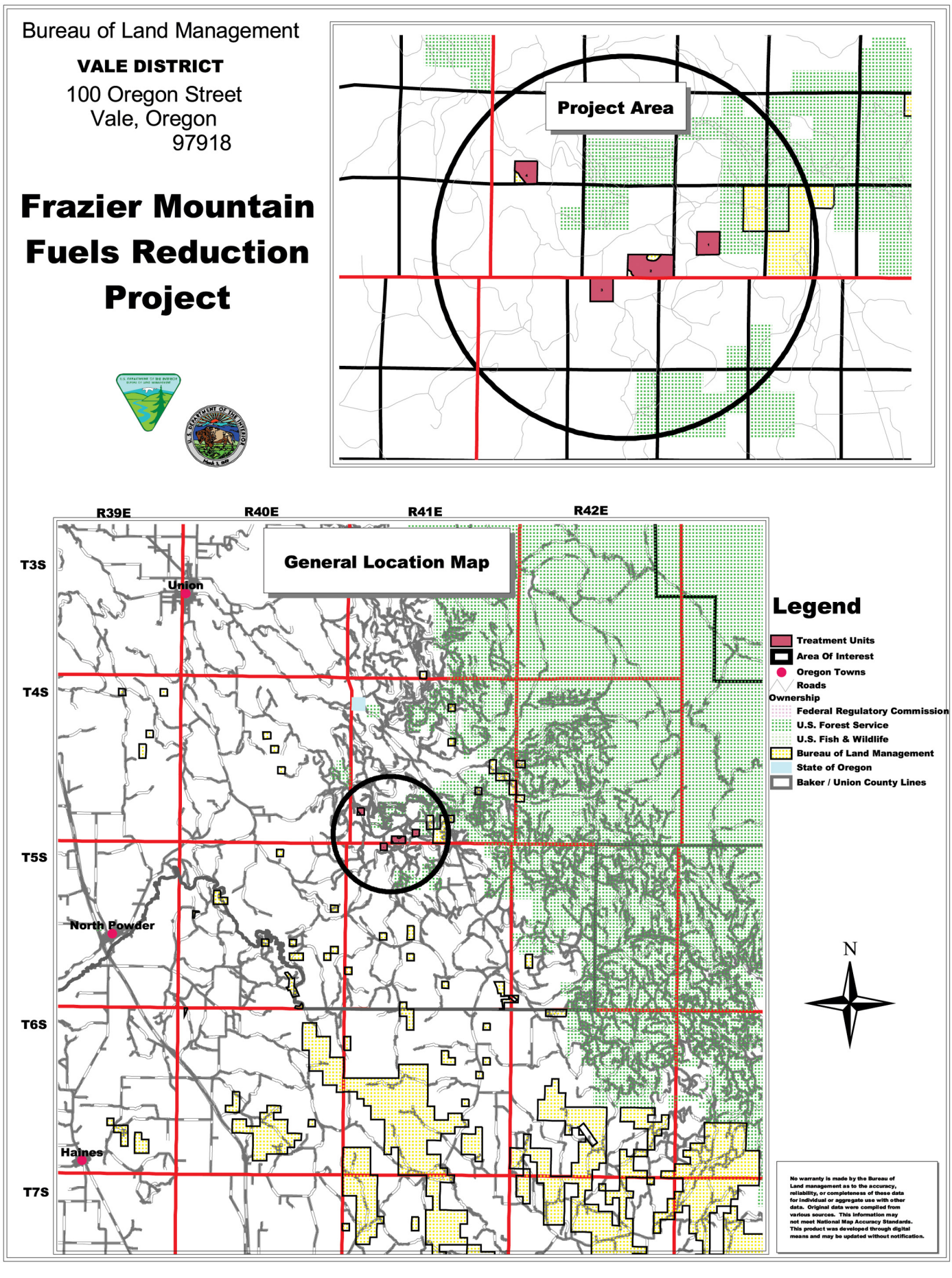
The primary purpose of the Frazier Mountain Fuels Project is to reduce fuel loads that currently pose a high risk of stand replacement fire. Subsidiary goals include increasing stand health, reducing the incidence of insect and disease, and encouraging the growth of desirable fire tolerant tree species. The Frazier Mountain Fuels Project consists of four separate BLM tracts (three 40 acre tracts and one 80 acre tract). See attached vicinity map for the project area.

Forest stands within the proposed project area are dense, and have suffered from insect and disease-related tree mortality. These stands are generally characterized by large amounts of standing dead and dead and down material. Historically, wildfire acted as a natural thinning agent within this area. The removal of fire as an ecosystem maintenance component has resulted in the accumulation of large quantities of fuel. This fuel, much of which is ladder fuel, is comprised both of dead trees and dense understory vegetation. These dense stand conditions, as well as the presence of large quantities of dead, rotting wood, have reduced stand vigor, dramatically increased susceptibility to disease and insect infestation, and significantly raised the potential for an uncontrollable crown fire.

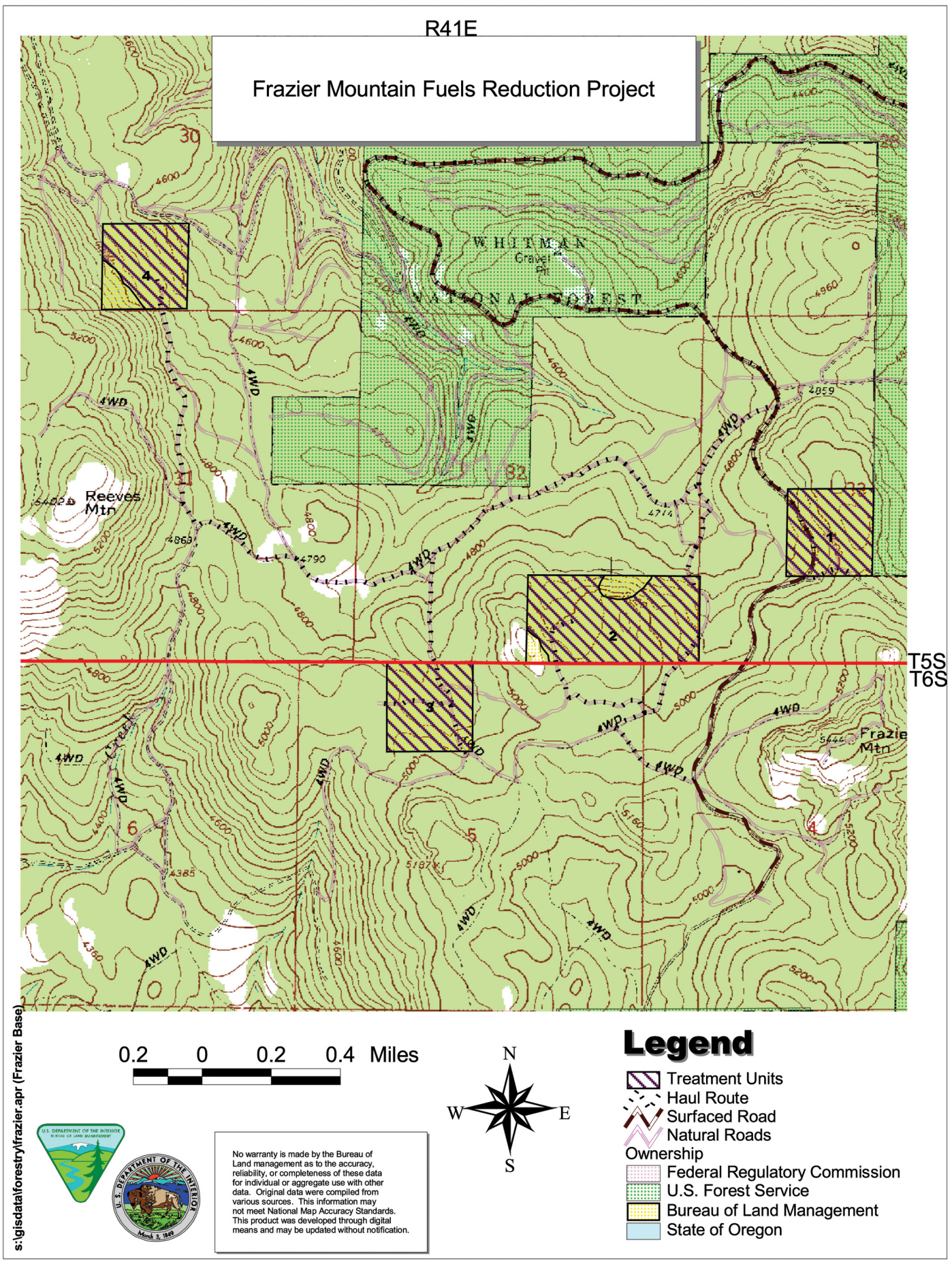
While the most prominent fuel-creating mortality agent in the area has been spruce budworm, some stands also are moderately infected with dwarf mistletoe. This dwarf mistletoe also can reduce tree vigor and predispose infected trees to bark beetle attack. Many trees in both areas show signs of bark beetle infestation.

In the late 1980's, damage by spruce budworms killed most of the white fir trees on all four BLM tracts described above. Over the past 10 years, about half of the snags have fallen and as a result, the fuel loading levels have become extremely high. It is estimated that over the next 10 years, the remaining snags are expected to fall. If a fire were to burn through these tracts the heavy fuels could lead to a stand replacement fire that would kill most of the remaining trees and cause excessive soil damage. The treatments proposed in these tracts are designed to remove most of the heavy fuels.

1.1 Vicinity Map



1.2 Project Location Map



1.3 Actions Common to both Action Alternatives

This project proposal involves forest activities designed to reduce fuel loads that impose a high risk of wildfire. Activities such as pre-commercial and commercial thinning, removal of snags and down wood, and prescribed burning may be used. The surrounding lands are mostly privately owned and have been heavily logged in the past. There are numerous existing roads within the project area; therefore no new roads will be needed to implement either of the action alternatives.

Timber and snag falling would be done by hand or mechanical harvesters. Limbs would remain attached to the bole of the tree during yarding operations. Log yarding would be done with small tractors or low ground pressure mechanical harvesters which are restricted to pre-designated skid trails spaced approximately 100 feet apart. Existing skid trails would be used wherever possible. When skidding uphill on slopes exceeding 20% the leading end of the logs would be suspended above the ground to prevent gouging of the soil. Skidding operations would avoid noxious weed sites. To prevent soil erosion following skidding, the skid trails may be water-barred following all ground based operations. In areas where bare soil is exposed and it is determined that seeding is necessary, native grass seed would be used to rehabilitate the sites. The proposed action is subject to the Baker Resource Management Plan (RMP, 1989) and Record of Decision (ROD). The standard design features listed on pages 37-40 of the RMP and ROD would be implemented. Within the fuel treatment areas RMP guidelines for snag and down log retention would be followed.

Within each proposed treatment area there are areas of heavy fuel combined with dense areas of commercial and pre-commercial sized live trees. Three separate treatments are proposed within each of the treatment areas. The first is a fuels treatment, the second a commercial thinning, and the third a pre-commercial thinning. The boundaries of the individual treatments overlap, i.e. more than one treatment may be applied to a single area, so the treatment areas added together exceed the total acreage of the tract.

Under each action alternative, the existing riparian exclosure located in the SESW, Section 30 would be reconstructed and extended by approximately 200-300 feet. The exclosure is currently non-functional and should be reconstructed.

1.4 Conformance with Existing Land Use Plans

This proposal has been reviewed to determine if it conforms with the Baker RMP, terms and conditions as required by 43 CFR 1610.5. The Baker RMP provides general direction for soil productivity, riparian area protection and other resources. This proposal has been found consistent with all applicable terms, conditions, standards, and guidelines specified in the Baker RMP.

1.5 Issues and Concerns Identified during Scoping

Comments were solicited from individuals and groups during the scoping period. A scoping letter was mailed on March 15, 2002, and a public meeting was held in Cove, Oregon on March 4, 2002. Comments and issues raised during the scoping process were used during the final project development and/or incorporated into the project by means of adding mitigation measures and project design features and/or modifying the proposal where feasible.

Management concerns that were not identified as issues are addressed, even though there is minimal or no impact expected to the majority of these concerns. These concerns have not been raised by the public, but effects will be analyzed by the interdisciplinary team as part of these project proposals, because there are resources within the project area that could be impacted.

1.6 Issues and Concerns that were considered, but eliminated from further analysis

Is this project classified as a Wildland Urban Interface? The Frazier Mountain Fuels Reduction Project is not classified or funded under the Wildland Urban Interface (WUI) program; the project is partially funded out of the National Fire Plan hazardous fuels program, outside of the WUI.

Why are there no efforts to burn the area? Prescribed burning is one of the treatments that would be used under both of the action alternatives. However, portions of each unit would require mechanical treatment before underburning could be done because the existing stands have extremely heavy fuel loadings.

What evidence do you have that thinning reduces fire risk and severity? The Western Fire Research Center, located at Colorado State University found that reduced canopy fuels increase and decrease fire hazard simultaneously. Fuel treatment practitioners have concluded that a reduction in crown fuels outweighs any increase in surface fuel hazard. Omni and Martinson (March, 2002) noted similar conclusions in a report titled “Effects of Fuel Treatment on Wildfire Severity”.

Show fire history evidence to support this area is beyond the historic fire return interval. Field data obtained during the past year indicate visual composition and stand structure reflect a 35-100 year mixed severity fire return interval. The information also suggests a major portion of the forested stands within the project area are highly susceptible to catastrophic fire conditions. While a mixed severity fire may be more reflective of natural conditions, political, economic and social concerns would not support allowing this area to burn under those severe conditions in an attempt to mimic natural pre-settlement conditions.

2.0 Alternatives Including the Preferred Alternative

This section describes the No Action and the Action Alternatives considered for analysis. These Alternatives represent a reasonable range of potential actions considered that would meet the Purpose and Need described in section 1.0. This section also discusses specific design features that would be implemented under the action alternatives.

2.1 Alternative A (No Action Alternative)

The No Action Alternative is required by the National Environmental Policy Act (NEPA) to provide a baseline for the comparison of the alternatives. This alternative represents the existing condition. If this alternative were selected there would be no fuels treatment, commercial or pre-commercial thinning. Under the No Action Alternative, the BLM would undertake only custodial work, such as responding to fire starts and other normal activities within available budget, such as survey and monitoring work. Natural processes would continue at existing rates and levels.

2.2 Alternative B (Preferred Alternative)

This alternative is designed to reduce the existing fire hazard, pre-commercial thin areas with advanced conifer regeneration, and commercial thin the pockets of dense overstory trees. Within each of the four proposed treatment units there are areas of heavy fuel combined with dense areas of commercial and pre-commercial sized live trees. Three separate treatment methods are proposed within each of these units. The boundaries of individual treatments may overlap, so more than one treatment may be applied to a single unit. The individual treatment areas added together exceed the total acreage of the tract, due to the overlap. The three treatment methods under Alternative B, are described below:

Fuel Treatment - This treatment method involves the use of mechanical equipment and prescribed fire to reduce fuel loading on approximately 168 acres. This method would be completed in each of the four units as described in Table 1, below. The primary objective is to reduce the existing ground fuel residue to less than five tons per acre in the 0-3" diameter size class as best represented by fuel model 8 (fuel model type is characterized by slow-burning ground fires with low flame lengths and very light fuel loading). The larger diameter fuels (those greater than 3 inches) and snags would be reduced, while following the guidelines for snag and down log retention contained in the Baker RMP.

Existing fuels would be treated in areas that currently have excess snags and down logs. Surplus snags and down logs greater than 6 inches in diameter would be felled and skidded to designated landings located on existing roads.

Approximately one-half of the logs within the project area have enough sound material to make chip logs (chip logs have commercial value and are used primarily for producing paper products). In order to reduce the amount of fuel burned and potential smoke impacts to local communities, chip logs would be hauled off the project area by the purchaser. The remaining material will be piled, and burned during late fall or early winter. The BLM would be responsible for developing the burn plan and completing the pile burning.

Treated areas would be monitored for fuel loading concerns after project implementation. If monitoring data indicates the need to do a post-treatment, a broadcast underburn would be used to maintain desired fine fuel loadings and retard the re-establishment of less fire resistant tree species and shrubs.

Commercial Thinning - Under Alternative B, commercial thinning would be completed on approximately 69 acres. This treatment would consist of thinning overstocked stands, removing the smallest and mistletoe infected trees and retaining the largest, healthiest trees. Commercial thinning would reduce stand basal area to approximately 80 ft^2 per acre. Generally, harvested trees would be in the 8-20" diameter at breast height (dbh) range, but trees up to 24" dbh may be harvested. Retention tree species preference, by descending order would be: ponderosa pine, western larch, Douglas-fir, lodgepole pine, and grand fir.

Pre-commercial thinning - Approximately 85 acres of pre-commercial treatments would occur on advanced regeneration forest stands within the project area, using a 12-20 foot spacing standard. Species preference would be ponderosa pine, western larch, Douglas-fir, lodgepole pine, and then white fir. Ponderosa pine, western larch, and Douglas-fir would be favored over lodgepole pine or white fir. Generated slash that exceeds 5 tons per acres would be hand piled and burned in late fall or spring (burning slash during this time of year reduces the potential for fire spread and soil damage). In areas where the slash is less than five tons per acre, the slash would be lopped and scattered.

Table 1. Proposed Treatments under Alternative B

Unit Number	Tract Size (acres)	Treatment Area	Fuels Treatment	Commercial Thinning	Pre-commercial thinning
1	40	40	34	10	15
2	80	74	74	16	35
3	40	40	40	13	20
4	40	33	20	30	15
Total	200	187	168	69	85

2.3 Alternative C

This alternative is designed to reduce the existing fire hazard and pre-commercial thin advanced conifer regeneration without commercial timber harvesting. Within each of the four proposed treatment units, there are areas of heavy fuel combined with dense areas of commercial and pre-commercial sized live trees. The boundaries of individual treatments may overlap, so more than one treatment may be applied to a single area. The individual treatment areas added together exceed the total acreage of the tract.

Fuel Treatment - This treatment method involves the use of mechanical equipment and prescribed fire to reduce fuel loading on approximately 168 acres. This method of treatment would be used to treat fuels on all four of the units, as described in Table 2, below. The primary objective would be to reduce the existing ground fuel residue to less than five tons per acre in the 0-3" diameter size class as best represented by fuel model 8. The larger diameter fuels (greater than 3 inches) and snags would be reduced, while following the guidelines in the Baker Resource Management Plan for snag and down log retention.

Existing fuels would be treated in areas that currently have excess snags and down logs. This treatment would mechanically pile excess snags and down logs. Piling would be done with a low ground pressure tracked excavator equipped with a grapple for piling. The grapple arm would be able to reach 25 feet. Because of the large amount of material to be piled, the piles created by this operation would be large. Wherever possible the piles would be built at least 25 feet from desired retention trees. Piles would be burned in late fall or early winter.

Pre-commercial thinning - Under this alternative, approximately 85 acres would be pre-commercially thinned to 12-20 foot spacing. Species preference would be ponderosa pine, western larch, Douglas-fir, lodgepole pine, and white fir. Any ponderosa pine, western larch, or Douglas-fir would be favored over lodgepole pine or white fir. Areas where the slash generated by thinning exceeds 5 tons per acre the slash would be hand piled and burned in late fall or spring. Areas where the slash is less than five tons per acre the slash would be lopped and scattered.

Table 2. Proposed Treatments under Alternative C

Unit Number	Tract Size (acres)	Treatment Area	Fuels Treatment	Commercial Thinning	Pre-commercial thinning
1	40	40	34	0	15
2	80	74	74	0	35
3	40	40	40	0	20
4	40	33	20	0	15
Total	200	187	168	0	85

2.4 Project Design Features of the Action Alternatives

Design features are actions taken as part of a proposal to reduce or avoid negative effects of a proposed action. The following project design features would be implemented under either Alternative B or C.

Snag and down log retention: Retention of down logs and snags which wildlife rely would follow RMP guidelines (RMP, p.39). At least 5-10 down logs, 20 feet in length, with 12-inch small end diameter would be retained. Additionally, 4 of the largest snags per acre would be retained in each unit. Because of the lack of existing snags on adjacent private lands and the great amount of use by cavity nesting bird species on lands administered by the BLM, the requirement for more snags per acre is greater than the minimum required by the RMP.

Avoidance of sensitive species habitat: If northern goshawk, cougar, or other sensitive species habitat is found in the project area, that habitat would be avoided. In general, treatments would be scheduled to avoid or minimize disturbance of wildlife.

Slash pile burning: Slash piles would be burned in late fall or early winter. This would minimize the risk of fire spread as well as impact to soils.

Pre-commercial thinning slash: In general, pre-commercial thinning slash would be lopped and scattered and would not exceed the recommended 5 ton per acre and 0-3" diameter size class guidelines.

Streamside buffers: Streamside buffers would be implemented to protect riparian habitat. The buffers are 150 feet on each side of perennial non-fish bearing streams and 50 feet on each side of intermittent streams. If future analysis reveals a need to enter these areas in order to protect or enhance riparian habitat, low-impact activities may be proposed.

Vegetation manipulation: Treatments would be designed to create a vegetation mosaic in areas with crucial wildlife habitat. Areas where major vegetation manipulation occur and rehabilitation is necessary, livestock grazing would be deferred for at least two to five growing seasons following treatment. Areas disturbed by treatments would be reseeded with native grasses, forbs and shrubs in accordance with habitat requirements.

Cultural resources: Cultural resources will be avoided during treatment.

Soils/Hydrology: Existing roads in the project area will be used. No new roads would be constructed during the implementation of this project.

Ground Based Yarding: Yarding would be done with ground-based equipment and existing skid trails will be used wherever possible. Skid trails would be pre-designated and spaced a minimum of 100 feet apart. When skidding uphill on slopes exceeding 20%, the leading end of the logs would be suspended above the ground to reduce soil disturbance. Following yarding, skid trails would be water-barred to prevent soil erosion, and in areas where bare soil is exposed native grass seeding would be used to re-vegetate the area.

3.0 Affected Environment

3.1 Fuels and Wildfire

Historical fire regimes in the Blue Mountains have been the subject of several studies; the most recent by Heyerdahl, Olsen, and Agee in 1996 and 1999. These studies found that fires were larger, more frequent, and lower in intensity. Fire was a dominant natural process in maintaining an open park-like condition throughout these ecosystems. Fire return intervals in the dry forest types was 5 to 12 years or less and 35 to 100 years in the moister mixed conifer stands. These fires would have resulted in lower fuel loadings and reduced dead/down wood compared to the current condition. Frequent fires would have pruned lower limbs and consumed other types of ladder fuels, reducing the chances of stand replacement fires. Stand density would have been lower, consisting of large trees with little advanced regeneration. Large fire-resistant trees would have been common. Numerous low-intensity fires would have resulted in widespread smoke and historians feel this was the source of the name 'Blue Mountains.'

Fire occurrence declined abruptly beginning in the late 1800's due in part to extensive logging and livestock over grazing. This combined with effective fire suppression has resulted in the current existing condition of fuels buildup and high stand densities of small trees well beyond historic conditions throughout the Pacific Northwest (Natural and Prescribed Fire in Pacific Northwest Forests, 1990). This buildup of fuels and stand densities has led to a dramatic increase in fire intensities. Where low intensity fires once burned, large stand replacement fires are now a common scenario.

Current conditions within the forested stands of the Frazier Mountain area fit the common scenario of above normal fuels accumulations with overstocked stands. The removal of fire as an ecosystem process has increased the project area's vulnerability to disturbance and reduced its ability to recover rapidly from a fire disturbance. Plant communities within the Frazier Mountain project area reflect a Fire Regime II (0-35 year return interval, mixed and high severity) and Condition Class 2 with downward, perhaps accelerating, trend towards Condition Class 3. Recent fuels inventory and the Behave Fuels Modeling and fire prediction program support the fact that these forested sites are currently in a state that would be very susceptible to a stand replacement fire. For example Fuel Model #10 (General Technical Report, INT-122, 1982), which most accurately reflects the existing conditions within the Frazier Mountain area, predicts flame lengths of 8 feet and a crown scorch height of 45 feet during average summer weather conditions. Flame lengths greater than 8 feet typically require the use of heavy equipment and retardant aircraft to suppress (Fireline Handbooks, 1989) which are not only costly but often have a significant negative impact on the vegetation, soil, and watershed. In addition spruce budworm damage from the late 1980's had resulted in a large number of snags within the project area. These snags contribute greatly to the existing fire hazard and may present a safety threat to the public as some snags are adjacent to public roads and private lands where logging activity is taking place. The majority of the lands administered by the BLM are surrounded by private lands. These private lands have been extensively logged and slash accumulations were machine piled in most areas to reduce the fire hazard. As a result, much of the private lands have significantly reduced the fire hazard while BLM parcels continue to be highly susceptible to fire and pose a significant threat to private ground adjacent to the analysis area.

3.2 Forest and Forest Health

Forest stands in the project area are in the warm dry forest potential vegetation group described in Chapter 2, pg. 63-75 of the Draft Interior Columbia Basin Ecosystem Management Project EIS (May, 1997). Historically these stands were characterized by open stand conditions that were maintained by frequent low-intensity fire. Frequent fire maintained fire resistant species such as ponderosa pine, western larch, and Douglas-fir. Fire exclusion has allowed the stands to become overstocked with fire intolerant species such as white fir. Timber sales in the 1950's and 1970's removed a portion of the large overstory trees. In the 1980's the stands had a high percentage of white fir. Most of these white fir trees died in a spruce budworm epidemic that occurred in the late 1980's. Now the BLM tracts have a very large number of snags and down logs in the 10-20 inch diameter classes. The live tree overstory that remains in the tracts is quite variable. Stocking ranges from virtually no stocking to densely stocked areas. Tree species in the live tree overstory include white fir, ponderosa pine, Douglas-fir, lodgepole pine, and western larch trees. Scattered throughout the tracts are pockets (up to 10 acres) of conifer regeneration that is dominated by white fir, with minor amounts of ponderosa pine, western larch and Douglas-fir. In 1999 the 80 acres in Section32 were planted with western larch. There was poor seedling survival because of a large gopher population.

Unit 4 which is a 40-acre tract in Section 30 had less white fir in the overstory when the spruce budworm epidemic occurred. The east half of this tract has had little mortality. There is quite a bit of mortality in the west half of the tract. Most of this area has a well-stocked overstory of ponderosa pine, western larch, Douglas-fir, and white fir. The live tree basal area averages 120 ft^2 of basal area. There are also pockets of understory, up to 30 ft. tall, of white fir, Douglas-fir, western larch, and ponderosa pine. Some of the Douglas-fir trees are heavily infected with dwarf mistletoe.

In general, the overstory within Unit 4 has a few widely scattered trees that are greater than 150 years old. There are not enough large-old trees in the stand for the stand to be classified as old forest.

Forest Insects: Frequent low-intensity ground fires naturally thinned the forest stands. The lack of frequent fires has allowed tree density in the forest stands to dramatically increase and the growth of individual trees has decreased. The decline of individual tree growth has made the stands susceptible to attack by bark beetles. Recent research by Cochran et al. (1994) recommends specific stocking levels to keep stands healthy and growing, avoid suppressed and stagnated trees, while maintaining the stand at low risk to bark beetle attack. For the plant associations in the project area, Cochran's guidelines recommend stocking levels of 80 ft^2 of basal area per acre. The basal areas within the project area average 120 ft^2 of basal area per acre, with some stands exceeding 200 ft^2, clearly exceeding the recommended stocking levels. A risk rating system has been developed to rate individual stands risk of being attacked by Douglas-fir beetle (Their, 1984). The stands are currently rated as having a moderate to high risk of being attacked by Douglas-fir beetle.

Forest Disease: Within the treatment areas there are Douglas-fir trees infected with Dwarf mistletoe (*Arceuthobium douglasii*). Douglas-fir dwarf mistletoe is a parasitic plant that infects only Douglas-fir trees. Infected trees are damaged as they allocate food and water normally used in tree growth to witches broom development and supporting the mistletoe system. Witches brooms are masses of ball-shaped growths on branches. The result of this infection is a reduction in tree growth. Trees weakened by mistletoe are particularly susceptible to Douglas-fir bark beetle attack during periods of stress, such as drought. Mistletoe moves relatively slow through stands. The infection is spread from tree to tree by seeds being ejected from infected trees to uninfected trees. The range of ejected seeds is less than 50 feet. Douglas-fir mistletoe will not infect other tree species. The multi-canopy host type favors the spread and development of heavy levels of mistletoe infection over time. There is evidence that periodic ground fires helped control the spread of mistletoe in the past by spacing trees, and removing broomed individuals and understory trees that were likely infected (Interior Columbia Basin Ecosystem Management Project, Ch 2 pg. 67).

The presence of dwarf mistletoe can be beneficial for some objectives and detrimental to others. Broomed trees provide habitat for some birds and small mammals, and plants are a minor supplementary food source for others. Maintenance of healthy stands is the desired future condition, and stands are no longer healthy when dwarf mistletoe levels become excessive and impacts occur. Heavily broomed trees increase the potential for a stand replacement fire.

Mistletoe infection can be effectively removed from stands with a low level of infection by removing the infected individual trees and small clumps of trees with a commercial thinning. To meet various resource objectives there may be a need to retain some infected trees within treatment blocks. This should be designed in a manner that minimizes potential for spread to healthy trees and uninfected portions of the stand. The recommended procedure for meeting this objective is to isolate selected infected reserve trees in small discrete groups or clumps. Use of non-host or unstocked buffers of at least 50' between infected trees and treatment areas or uninfected residuals can be used.

3.3 Wildlife and Wildlife Habitat

All four units within the project area contain numerous standing snags and down logs. Most of these snags and logs are from the dead and dying white fir trees in the area. These snags provide opportunities as habitat for cavity dependent wildlife species. The downed logs in the area provide an opportunity for habitat for those wildlife species that use down logs for a portion of their life history needs.

There are approximately 125 wildlife species that use mixed conifer forested habitat for the primary purposes of feeding and breeding. These species include; mule deer, elk, mountain lion, pileated woodpecker, blue grouse, a number of bat species, and numerous species of neotropical migratory birds. There are approximately 27 species of wildlife associated with mixed conifer habitat that use snags as breeding or feeding habitat. In addition, there are approximately 65 species of wildlife associated with mixed conifer habitat that rely on down logs for a portion of their life history needs.

In Section 30, there is a large amount of elk sign leading to and from an existing spring. This spring is currently unprotected from domestic livestock use and has the potential of being damaged beyond recovery. This spring is an important watering and wallowing site for elk in the area. Wallows that are hidden from disturbance are a scarce and unique habitat for elk.

Because of the heavy harvest activities on private land adjacent to lands administered by the BLM in the area, the BLM lands have become the only effective cover for big game in the immediate area. Of the approximately 2,900 acres in the surrounding landscape, 238 acres of land administered by the BLM and FS provide the majority of cover. Therefore, approximately 8% of the surrounding landscape is in conditions suitable for cover. There are approximately 173 acres in satisfactory cover and 65 acres in marginal cover. Most of the remaining 2,900 acres is considered foraging habitat for deer and elk.

The habitat effectiveness index for big game in this area is .37. Indices closer to 1.0 indicate that the habitat in the area in highly effective for elk and deer. Lower numbers near 0.1 indicate that the habitat in the area is not effective in providing forage and cover for deer and elk (Thomas, et. al., 1988). The habitat effectiveness for elk and deer in the Frazier area is low to moderate. To increase the habitat effectiveness in the area, cover habitat must be increased to balance the ratio of cover to forage.

There has been one sighting of a northern goshawk (*Accipiter gentilis*) on lands administered by the BLM in the Frazier project area. The northern goshawk is considered a Bureau Sensitive species and habitat for this species is managed to not contribute to the need to list the species (BLM Manual 6840). All of the BLM forested acres in the project area are considered suitable nesting habitat for northern goshawks. Surveys to determine occupancy and nesting locations were completed during the 2002 field season with no confirmed sites identified. If an active goshawk nest is located in the project area, fuels reduction activities would be seasonally restricted to protect the nest site.

There has been numerous sign and observations of pileated woodpeckers in the area. Surveys for pileated nest trees would be conducted during the time trees are being marked. If nest trees are discovered, they will be retained in order to prevent the loss or disturbance of pileated woodpeckers nesting trees in the area. There has also been an observation of a cougar den in the Frazier area. Although cougars are not considered a special status species by the BLM, efforts to protect den sites would occur.

3.4 Fisheries and Fisheries Habitat

The Frazier Fuels Treatment is located in the Catherine Creek watershed. An analysis of the Catherine Creek watershed was completed by the La Grande Ranger District in 1999. According to this analysis, streams within this drainage support populations of spring/summer Chinook salmon, summer steelhead, bull trout, redband trout, mountain whitefish, sculpins, dace, suckers, redside shiners, northern squawfish, and several non-native, warm water species. The closest tributary of Catherine Creek is Milk Creek. Milk Creek flows within ½ mile of the project area in Section 30.

Chinook salmon were listed as a threatened species by the National Marine Fisheries Service (NMFS) in April of 1992. Chinook salmon currently use 34.5 miles of Catherine Creek and its tributaries for spawning and rearing. Most spring and summer Chinook salmon spawn in the main stem of Catherine Creek directly below the North and South Forks approximately 3 miles below the project area.

Steelhead are present in most of the 326.5 miles of habitat available within the Catherine Creek watershed. Spawning is widespread, but most spawning observations occur within headwater tributaries.

Bull trout spawn in approximately 36 miles of habitat within the Catherine Creek watershed, primarily within the North and South Forks of Catherine Creek.

All four tracts (units) within the project area are located above Milk Creek. Oregon Department of Fish and Wildlife (ODFW) aquatic habitat surveys, completed for Milk Creek documented salmonid fish species approximately 2 miles below the Section 30 parcel (Unit 4) and 4.5 miles above the Section 33 parcel (Unit 1). Stream surveys for Milk Creek indicate that pool habitat is lacking, but the pools that are present contain high quality habitat and are functioning properly. The amount of vegetation along Milk Creek is insufficient to fully shade the creek, but stream temperature is not outside the range required by anadromous salmonids. Large wood debris is present in adequate levels for this stream type. Overall, the habitat conditions within Milk Creek are considered to be fair to good.

3.5 Cultural Resources

The original Frazier Timber Sale was inventoried for cultural resources in 1980. Two cultural resource sites were found on BLM land inventoried. One of the sites is a historic cabin identified for avoidance. The other was six locally-occurring basalt cobbles and spalls of questionable cultural origin. An inventory update of 110 acres in the four project treatment units was conducted in November 2001 and May 2002. Although no new cultural resources were identified, both previously recorded sites were relocated. The historic cabin site, which has further decayed since 1980, was re-recorded. The cabin site is adjacent to an existing timber haul road and will be avoided by treatment actions. The fractured cobbles, located at the junction of two old logging roads, are thought to be of relatively recent origin, probably a result of heavy equipment operation during historic logging operations.

3.6 Hydrology

This project is located within the Upper Grande Ronde Subbasin (4^{th} field HUC), Catherine Creek Watershed (5^{th} field HUC), and the Milk Creek Subwatershed (6^{th} field HUC). There are no registered water rights adjacent to or within one mile downstream of the project area.

There are no perennial streams on BLM managed land within the project area. One spring was found during field review which had surface water during the summer months. An old exclosure around this spring is no longer functioning, and livestock grazing in this area has caused bank

trampling, soil compaction, increased sedimentation into the adjacent stream channel, and has impacted riparian vegetation.

Most of the other drainages in the project area are ephemeral, and only have surface flow during storm events. Catherine Creek is the only stream listed on the Oregon 303(d) list for water quality limited streams in the near vicinity of the proposed project (DEQ, 1998).

There are numerous existing roads within the project area. Some of the roads are currently closed to vehicular traffic, although they have not been decommissioned and consequently could be used for this project.

3.7 Soils

The following soils information was compiled mainly from the Soil Conservation Service (now called the Natural Resources Conservation Service) Soil Survey of Union County Area, Oregon (SCS, 1985).

The main soil types in the proposed project area consist of Olot silt loam and Tolo silt loam. There is also some Olot stony silt loam and a small inclusion of Anatone extremely stony loam.

The Olot silt loam is on very gentle slopes, 2 to 12 percent, and was formed in volcanic ash and loess deposited over a soil derived mainly from basalt. It is a moderately deep, well-drained soil on ridgetops in mountainous uplands. The surface is typically covered with a mat of needles, twigs, and duff approximately one inch thick. Runoff is slow to medium and the water erosion hazard is slight to moderate. The ash layer has exceptionally high available water holding capacity as well as a significant amount of nutrients available for plant growth.

The Olot stony silt loam is found on slopes of 12 to 35 percent, but are basically the same as that described above for the Olot silt loam except for the presence of more stones in the soil. Because of the steeper slope, these soils also have a higher runoff rate of medium to rapid and the water erosion hazard is moderate to high.

The Tolo silt loam found in the project area is broken into two categories based on slope, the first being from 12 to 35 percent and the second from 35 to 65 percent slope. These soils are deep, well drained in mountainous uplands. This soil was also formed in volcanic ash and loess deposited over a soil derived mainly from loess and basalt. The typical surface of these soils are covered with a mat of needles, twigs, and duff about two inches thick.

Runoff associated with the Tolo silt loam on gentler slopes is medium to rapid and the water erosion hazard is moderate to high. On the steeper slopes, runoff is rapid and the water erosion hazard is high. Again, these soils have an ashy surface layer which has exceptionally high available water holding capacity and a significant amount of nutrients available for plant growth.

There is one small inclusion of Anatone extremely stony loam in Section 32, which is found on slopes from 2 to 35 percent. This is a shallow, well-drained soil found on ridgetops and on south and west-facing slopes of uplands. This soil formed in colluvium and residuum derived mainly

from basalt, and there is some loess and ash present in the surface layer. There are also inclusions of rock outcrops in this soil type. Runoff is variable and the water erosion hazard can be slight to high.

For the majority of the project area, all of the soils have a surface layer formed of volcanic ash, which is important for both water holding capacity as well as nutrients. This ash layer has low strength during wet periods and can be easily detached during dry periods. Because of this, care should be taken to disturb this layer as little as possible when using heavy equipment for any projects.

3.8 Botanical Resources

There are no federally listed threatened or endangered plant species known or likely to occur in the vicinity. Botanical surveys found no BLM "sensitive" or "assessment" plant species. One BLM designated "tracking" species, mountain ladies' slipper (Cypripedium montanum), was located on all 4 units, and was most common in open habitats dominated by huckleberry (Vaccinium membranaceum). Bureau policy for "tracking" species incorporates data tracking in cooperation with the Oregon Natural Heritage Program, and appropriate project design to ensure that the species are maintained over the long term. Project design features/mitigation measures for this species have been incorporated in the proposed action.

4.0 Environmental Consequences

4.1 Fuels

4.1.0 Alternative A (No Action)

The probability of stand replacement fire would remain the same or increase as fuel loadings continue to accumulate over time. The threat from wildfires to adjacent landowners would remain at existing levels. Efforts to control wildfire in this area may be hampered by increased fire intensities and long range spotting. Under this alternative, post burn fire severity is expected to increase significantly.

Air quality would not be directly affected under the No Action alternative. However, under this alternative fuel loads would remain at existing levels and the potential for higher particulate matter levels under a naturally occurring wildfire remains the same. The riparian exclosure located in Unit 4 would not be reconstructed and resource damage to the existing spring would continue to occur.

4.1.1 Alternative B (Preferred Alternative)

Under this alternative we can expect a significant reduction in dead fuel loadings and existing snags. Treatment of this fuel would significantly reduce fire intensities and snag reductions could minimize the probability of long range spotting. Air quality would be impacted by prescribed burning of the landing piles in the form of short-term increases in particulate matter

concentrations. However, the amount of smoke produced under this alternative would be less than in Alternative C, because much of the large wood debris would be hauled off the project area.

4.1.2 Alternative C

This alternative differs from the preferred alternative in that no wood would be hauled from the site. Alternative C would emphasize the reduction of: fuel loadings, snags, fire intensities, and long range spotting in the event of wildfires. Air quality, under this alternative would be impacted more than in Alternative B, by producing more particulate matter from prescribed burning. The amount of additional smoke is hard to measure, but it is reasonable to assume that greater concentrations of fuels would result in slightly higher levels of short-term particulate matter.

4.2 Forest and Forest Health

4.2.0 Alternative A (No Action)

Forest Stand Structure - Stand structure consists of tree species, composition, size and stocking levels. In the short term the stand structure would not change substantially from the existing structure. As the young trees in the understory grow the tracts would again become dominated with fire intolerant species such as white fir. The size of the trees would slowly increase over time. Existing overstocked stands, both overstory and understory, would become denser as the individual trees grow larger. The number of snags would slowly decrease as the white fir snags rot and fall over. These down logs would add to the already excessive fuel loadings.

Forest Insects - bark beetles: Over time the density within the live trees stands will increase as trees grow larger. This increase in stand density will increase the susceptibility to bark beetle attack. This will increase the number of snags and down logs which will add to the already high fuel loadings. The risk of being attacked by Douglas-fir beetle would increase from moderate to high.

Forest Disease - Douglas-fir mistletoe: In stands where mistletoe already exists the level of infection will slowly increase over time. The infected stands currently have light infection levels, this would increase to moderate infection level over time. In addition the number of trees infected would slowly increase as additional trees become infected.

4.2.1 Alternative B (Preferred Alternative)

Forest Stand Structure: The proposed pre-commercial and commercial thinning would remove most of the fire intolerant white fir trees. Following thinning the species composition would shift to fire tolerant species such as ponderosa pine, western larch and Douglas-fir. The fuels treatment would remove most of the excess snags and down logs. The stocking level of live trees would be reduced to approximately 80 ft^2 of basal area.

Forest Insects - bark beetles: The commercial thinning would reduce stand basal area to the recommended level. In the short term this would reduce the stand susceptibility to bark beetle attack. After the thinning trees in the stand will release and the stand density will slowly increase.

In approximately 30 years another commercial thinning would be needed to reduce stand basal area to desired levels. Maintaining stand basal area with the recommended levels would keep the susceptibility to bark beetle attack low.

Forest Disease - Douglas-fir mistletoe: Removing most of the mistletoe-infected trees would dramatically reduce the level of mistletoe infection throughout the BLM tracts. The level of infection would remain low for many years. Mistletoe infected trees that are retained would be isolated from other Douglas-fir trees which would prevent spreading of mistletoe.

4.2.2 Alternative C

Forest Stand Structure - tree species, composition, size and stocking levels: In this alternative the large number of snags and down logs would be reduced through piling and burning. The live tree overstory would not be thinned, so the stocking levels and species composition would not change. In the understory pre-commercial thinning would reduce stocking levels and shift the species composition to more fire tolerant species. There are no major differences anticipated compared to Alternative B involving commercial thinning because of the small number of acres involved (69 acres).

Forest Insects and Disease - bark beetles and mistletoe: Without commercial thinning, stocking levels in the overstory will remain at currently high levels and the stands will remain susceptible to bark beetles. The current level of mistletoe infection would remain in the stands and would slowly increase over time.

4.3 Wildlife and Wildlife Habitat

4.3.0 Alternative A (No Action)

Under the No Action Alternative there would be no immediate impacts to wildlife in the area because there would be no actions conducted on lands administered by the BLM. Existing conditions would remain and existing use by wildlife would continue.

Long-term effects on wildlife would be associated with the loss of trees on lands administered by the BLM due to natural mortality. As existing snags fell and became down logs, those wildlife species dependent upon down logs would benefit from the increased habitat. However, those wildlife species dependent upon standing snags for habitat would see a decrease in the existing habitat. As existing green trees died and became snags this would balance out the loss of those fallen snags. However, this would only last until there were virtually no remaining large green trees to replace those standing snags. Smaller trees would continue to grow and become large trees in approximately 50 years. These trees may become snags as early as 30 to 40 years, but

these snags would not be large enough for use by many snag dependent wildlife species. Trees with a diameter of 12 inches or greater provide the best opportunity for snag dependent wildlife species. This snag creation cycle would continue but would take approximately 50 years or more to complete.

Most wildlife species located in the area would remain in the area. With the dying of green trees to create snags, an increase in snag dependent wildlife would be seen.

4.3.1 Alternative B (Preferred Alternative)

Alternative B and C propose to reduce the current number of snags in the area to approximately 4 snags per acre. This reduction would comply with the guidelines in the Baker RMP by retaining habitat for 65% of optimal cavity nester populations on lands administered by the BLM. However, because of the low number or lack of snags on adjacent private lands, cavity dependent wildlife species are relying on snags on lands administered by the BLM for all or most of their habitat requirements. Therefore, at a landscape level, the population levels of cavity dependent wildlife species would probably be below the 65% optimal levels.

The immediate impacts to snag dependent wildlife in the area from the action alternatives would be the loss of snags currently used for foraging and roosting which would cause a potential decline in numbers of cavity dependent wildlife in the area. The habitat required for 65% cavity nester wildlife populations would not decrease on lands administered by the BLM, however, the population levels over the entire landscape would decrease because of the lack of habitat on adjacent private lands.

Fuels treatment prescriptions for both action alternatives would reduce the current down log habitat on lands administered by the BLM. The reduction would comply with guidelines in the Baker RMP by retaining 5 – 10 logs per acre with the small end diameter of 12 inches or greater and at least 20 feet long. Because of the lack of down logs remaining on adjacent private lands, down log dependent wildlife are relying on lands administered by the BLM for most of their habitat needs. The reduction of down logs from lands administered by the BLM would decrease the population numbers of these wildlife species, although the decrease would be minimal. Furthermore, an increase and potential stabilization of down log habitat would occur as green trees continue to decay and become snags and snags continue to decay and fall as down logs.

The pre-commercial treatments would decrease deer and elk hiding cover currently existing in each of the BLM parcels. However, because of the topography on or the inaccessibility of the lands administered by the BLM, the pre-commercial activities would have a minor impact on hiding cover. Piling slash in areas with heavy slash concentration would allow elk and deer to move through the areas and not be deterred by the large accumulation of slash on the ground.

Special Status Wildlife Species: Gray wolf, Canada lynx, and bald eagle are all species listed under the Endangered Species Act, 1973, as amended. Due to lack of specific forest-types within the project area, habitat for Canada lynx does not exist and the possibility of this species traveling through the area is low. A designated habitat area for lynx is located approximately 5 miles to the northeast of the project area**.** There would be no effects to wolves associated with this project as per a letter from the District Manager dated January 19, 2000. Current surveys for northern goshawks have not located these birds in the planning area**.**

Surveys of the area for wildlife and other visits to the area have not located eagle nests or roost locations. Furthermore, there have been no documented sightings of eagles in or around the area. Continued surveys for northern goshawks in the area will document any sightings of other wildlife species.

Immediate impacts associated with Alternative B would be the reduction of live green trees in the area and the reduction of effective thermal cover for elk and deer. There would be approximately 69 acres of commercial thinning on lands administered by the BLM reducing the satisfactory thermal cover to approximately 104 acres and the overall cover to approximately 169 acres (7%). However, there would be an insignificant reduction in the Habitat Effectiveness index of cover, from .37 to .36. This is a result of the minimal amount of cover currently existing in the area (8%). With the land ownership pattern in the area, the impacts associated with BLM activities are relatively minor compared with the current and past activities occurring on private lands. The activities in the area would open up the forest canopy and provide additional forage under the forest canopy. This would add to forage available for deer and elk and may be used relative more than other areas because of the protection of the standing trees.

There have been intense logging activities in the area on private land adjacent to lands administered by the BLM. These activities have occurred in the area in recent years and are not expected to continue because most or all of the private land has been harvested to date. Because of the current activities on private lands in the area, the remaining forested habitat on lands administered by the BLM are the only small areas of refugia left in the area for wildlife. However, because of the size of these areas, these refugia are only marginally effective for many wildlife species. By reducing the crown closure in these areas and some of the hiding cover, this would make these small refugia even less effective. Wildlife species would seek cover and protection in other forested stands. And because of the lack of cover within the planning area, wildlife species would need to travel some distance to locate refugia.

Lands administered by the U.S. Forest Service occur in the area, as well, and is adjacent to one of the BLM parcels. There are no current plans for harvest by the FS on those lands.

4.3.2 Alternative C

Because the only difference between Alternative B and Alternative C, is the burning of large material on site, the impacts associated with activities planned in Alternative B would be similar to the impacts expected to occur under Alternative C.

4.4 Fisheries and Fisheries Habitat

4.4.0 Alternative A (No Action)

Under the No Action alternative, no work would occur that has the potential to directly effect fish species or habitat. The current stream temperature, sediment inputs, erosional processes, woody debris recruitment, and hydrologic processes would continue to function at existing rates and levels. Fish populations and habitat suitability are expected to remain at existing rates and levels.

4.4.1 Alternative B (Preferred Alternative)

Actions that have the potential to cause mortality may occur from equipment working in or near a stream channel. This proposal does not include the use of equipment in or around any stream. No actions, with the exception of reconstructing one riparian exclosure, would be completed within any Riparian Habitat Conservation Area (RHCA). The riparian exclosure would be reconstructed using low impact methods and natural materials.

Water temperature, and altered large woody debris inputs are closely linked to riparian habitat, primarily within 100 feet of streams (FEMAT V-28). Under **Alternative** B, no vegetation would be altered within RHCA's. Stream temperature and large woody inputs would remain at existing rates and levels.

Increased turbidity is generally related to the amount of ground disturbance, the distance the disturbance occurs from a stream channel, and the ability of sediment to travel from the disturbance to an active stream. Under **Alternative** B, no ground disturbing actions would occur within RHCA's or areas that have the potential to transmit sediment to an active stream channel.

Altered stream flows result from increasing the drainage network, primarily by increasing permanent road miles, and to a lesser extent, from removing riparian vegetation (FEMAT V-20). No permanent roads would be constructed to facilitate this project. Removal of understory trees, outside RHCA's would result in a minor increase in runoff, but the amount of additional runoff would be small and unquantifiable and the effects to stream flow negligible

RHCA's were established to protect aquatic species and habitat. Under this proposal, no ground disturbing actions would occur within this riparian network. Overall effects to listed fish species and habitat are expected to be inconsequential.

4.4.2 Alternative C

Effects to fisheries under Alternative C would be similar to Alternative B. Alternative C, is not expected to result in direct or indirect effects to fisheries species and/or habitat. No actions, with the exception of one riparian exclosure, would be completed within any RHCA. Effects to stream temperature, sediment inputs and streamflow, would be similar to those discussed under Alternative B.

4.5 Cultural Resources

4.5.0 Alternative A (No Action)

The No Action Alternative would have no direct or indirect effects to existing cultural resources. Cultural resources would continue to be monitored as funding and workload priorities allow.

4.5.1 Alternative B (Preferred Alternative)

Inventory updates for the Frazier fuels treatment project were completed in spring, 2002. One previously recorded historic archaeological cabin site will be buffered for avoidance from ground disturbance and fire effects. With avoidance of identified sites, this alternative would have no effect on sites potentially eligible for the National Register.

4.5.2 Alternative C

Inventory updates for the Frazier fuels treatment project were completed in spring, 2002. One previously recorded historic archaeological cabin site will be buffered for avoidance from ground disturbance and fire effects. With avoidance of identified sites, this alternative would have no effect on sites potentially eligible for the National Register.

4.6 Hydrology

4.6.0 Alternative A (No Action)

No timber harvest, fuels reduction, or slash burning would occur. The project area would continue to be characterized by high fuel loads with potential for stand replacement fires which in turn could impact soil productivity and snowpack accumulation in the project area . No changes to current peak and/or base flows from timber harvest would occur. No changes in sediment delivery from timber harvest and hauling would occur. The exclosure around the spring would be maintained at its current size, but would not be extended to provide for more riparian protection.

4.6.1 Alternative B (Preferred Alternative)

The only direct impact to the hydrology resource associated with the proposed project would be due to the maintenance and new construction to expand the exclosure around the spring in Section 30. During maintenance and construction, workers may have to walk through and near the spring source to transport materials and get the exclosure fence in place and functioning to prevent livestock from entering the area. Extension of the existing exclosure will occur for approximately 200-300 feet downstream of the spring to the property line. Width of the exclosure will average approximately 100 feet, which will increase the area of the existing exclosure by less than one acre. Negligible impacts to sediment, water quality, and riparian vegetation are expected from this work. As this spring source is the only place within the project area that there is intermittent and/or perennial water, no other direct impacts to the hydrology resource would occur.

Indirect and cumulative impacts to the hydrology resource could include changes in peak and base flows, changes in stream shade and temperature, changes in snow accumulation, and increases in sediment. Since there is only one spring in the project area and no intermittent or perennial streams, no impact to shade or stream temperature would occur with the proposed project.

Harvesting of trees can increase openings in the forest canopy which in turn can lead to greater accumulations of snow in these openings than would occur in an undisturbed forest. Warm rain-on-snow events can melt this increased snowpack quickly and result in higher than normal flows. Since much of the project involves reducing fuels by removing downed logs and/or cutting snags, this will not impact canopy cover within the project area. In areas where live trees are cut and removed, as in the commercial thinning areas, not all trees would be harvested, openings created in the forest canopy would be small, and any increase in snowpack due to these openings would not be expected to be large.

The trees left on site are expected to respond to the thinning with increased growth due to the reduction in competition. This growth from the largest trees left on site would result in this incremental chance of increased snowpack to be temporary. Due to the increased growth and vigor of the trees that were left on site, within approximately ten years most of the openings would have closed in enough so that any difference in snow accumulation before and after thinning would not be measurable.

Increases in base flows due to removal of vegetation are expected to be minimal and short lived. An increase in base flow can be expected after harvesting of trees in forested areas due to the fact that the trees that are harvested are no longer using water from the site. However, during thinnings, not all trees are removed, and the remaining trees may use more water than they had previously. Also, an increase in grasses and brush in this area can be expected which will utilize more water. So, for these reasons, any increase in base flows due to the harvest activities would only be expected to last for two to three years before the rest of the vegetation on site and any new vegetation that gets established would use up this increase. As mentioned above with snow accumulation, the removal of snags and downed logs would not be expected to impact base flows.

Timber harvest and skidding of logs using ground based equipment can increase the amount of bare soil, mainly in and around the skid trails, which can result in increased sediment to the streams, soil compaction, and loss of soil productivity.

Sediment delivery to the stream system is expected to be negligible as the project area is located within the upper headwaters and there are no intermittent or perennial streams which could act as a corridor for sediment transport downstream. Sediment delivery from the haul roads is also a possibility but should be minimized by the restriction of hauling to the dry season and/or when the road surface is frozen. Again, because of the location of the proposed project, sediment that may be mobilized from the road surface into a ditchline would not be expected to travel to a live stream because there are no intermittent or perennial streams within the project area.

Total acreage of the project area within the subwatersheds where work would occur is extremely small and would make any measurable impacts to the hydrology resource from harvesting, burning, and/or hauling in the subwatersheds negligible.

Most measurable changes to peak and/or base flows come from harvesting most or all of the trees in a stand, or due to changes in the stream network due to construction of roads and/or skid trails.

Pre-commercial thinning operations have not been shown to effect peak/base flows and/or snowpack accumulation. Therefore, since this alternative is only removing snags and downed logs and conducting pre-commercial thinning operations using existing roads and skid trails, no increases in peak or base flows and no increases in snowpack accumulation is expected under this alternative. Impacts in the RHCA due to exclosure maintenance and construction would be the same as those analyzed in Alternative B. Sediment impacts to the hydrology resource is expected to be similar to those analyzed in Alternative B due to the fact that ground based equipment would still be operating in the project area, and hauling of chip logs off site would still occur.

4.6.2 Alternative C

The fuels treatment, slash burning, and pre-commercial thinning activities stated in Alternative B would be exactly the same for Alternative C. This alternative will have no commercial thinning activities associated with it. The riparian exclosure around the spring area in Section 30 would be expanded as in Alternative B.

4.7 Soils

4.7.0 Alternative A (No Action)

No timber harvest, fuels reduction, or slash burning would occur. The project area would continue to be characterized by high fuel loads with potential for stand replacement fires which in turn could impact soil productivity and snowpack accumulation in the project area . No changes to current peak and/or base flows from timber harvest would occur. No changes in sediment delivery from timber harvest and hauling would occur. The exclosure around the spring would be maintained at its current size, but would not be extended to provide for more riparian protection.

4.7.1 Alternatives B (Preferred Alternative)

The soils in the project area have an erosion and runoff hazard that is variable between slight, moderate, and/or high (SCS, 1985). Most of the project area is characterized by gentle slopes with good ground cover, and are not expected to have surface erosion. The existing roads in the project area are in good shape and are not rutted, and the existing skid trails are also well vegetated. There are not well-defined channels or poorly vegetated areas which could transport sediment or allow for noticeable areas of surface erosion. Therefore, due to the gentle slopes in the majority of the project area, the well vegetated nature of the project area, the fact that there are no intermittent or perennial streams adjacent to any proposed units, and

the project design features that will be in place, the risk of soil surface erosion associated with the proposed activities should be low.

Burning of slash piles and broadcast burning can also cause impacts to the soil resource. Large slash piles which cause extreme heat can reduce soil productivity, remove soil nutrients, and provide a bed for noxious weeds to become established. The whole tree yarding will help reduce the amount of slash left within the units and the removal of chip logs will help reduce the size of slash piles at the landings. The slash piles at the landings are still expected to be large and burning of these piles will impact the soil directly beneath these piles. Impacts can be reduced by utilizing as much chip material as possible, allowing firewood cutting before pile burning, and burning of the piles in late fall or winter after snow is on the ground. After burning, these areas should be seeded with native grasses as soon as possible in late winter or early spring to reduce the chance of noxious weeds becoming established.

Soil compaction resulting from the use of ground-based equipment can occur during harvest and yarding activities. Although not all of the project area will have commercial harvest activities, some of the fuels treatment areas can also impact soil compaction as non-merchantable material will be skidded to the landings to reduce fuel loadings. Use of existing skid trails wherever possible will also minimize soil compaction, soil displacement, and loss of productivity. Seeding of bare soil areas with native grasses after yarding will also help vegetation establish quicker and help reduce soil erosion.

As mentioned above, the majority of the soils in the project area have an ash layer that is easily detached when dry and which has low strength when wet. For this reason, ground based yarding should be limited to the winter when there is an adequate snow mat to protect the soil, or during the summer when the soil is dry and equipment is operated over a slash mat. If yarding occurs during the summer, operations should be confined as much as possible to existing skid roads where soil compaction and/or displacement has most likely already taken place. Using these skid roads in conjunction with a slash mat over them will help reduce cumulative effects to the soils resource. In addition to the use of existing skid roads, because of the ash layer having low strength when being wet, all skidding activity should be halted during and after any summer thunderstorms until the soil dries.

Broadcast burning within the stands is not expected to cause appreciable impacts due to the timing and desired outcome of the burning. Broadcast burning would take place when fine fuels left on the forest floor could be consumed without burning significant amounts of larger material or allowing for high fire intensities that would damage the leave trees within the stand. This timing would be during the spring when the soil, duff, and large fuel moisture contents are high, or in the fall after enough moisture has been received to accomplish the burn plan prescriptions. Grasses, shrubs, and small trees may be killed by the fire which could for a short time (one growing season) increase the amount of bare soil in the project area. During this time, storm events such as a summer thunderstorm could cause some surface erosion within the project area, however no sediment would be expected to be mobilized downstream because of the gentle topography of the area and the lack of active stream channels in the project area.

With strict adherence to the project design features and standard design features listed above, the proposed project should not have measurable impacts to the soils resource.

4.7.2 Alternative C

The fuels treatment, slash burning, and pre-commercial thinning activities stated in Alternative B would be exactly the same for Alternative C. This alternative will have no commercial thinning activities associated with it. The riparian exclosure around the spring area in Section 30 would be expanded as in Alternative B.

Although there will be no commercial harvest under this alternative, skidding of snags and downed logs would occur, as would burning of slash piles and broadcast burning, and hauling of chip material would occur on the existing roads. For these reasons, impacts to soils are expected to be comparable to those analyzed in Alternative B.

Skid trails would be monitored during and after yarding operations. Monitoring would be used to ensure that existing skid trails are used to the greatest extent possible, skid trails are spaced 100 feet apart, and that a slash mat is on the trails to reduce soil impacts. Monitoring after yarding would include ensuring adequate waterbars are in place and native seeding has occurred on any bare soil areas.

Landings and large slash piles would be monitored after burning to ensure adequate vegetation establishment and to monitor for noxious weeds.

The riparian exclosure would be monitored annually to ensure that livestock are restricted from the spring area.

4.8 Botanical Resources

4.8.0 Alternative A (No Action)

Under the No Action Alternative, no direct or indirect effects to botanical resources are expected to occur.

4.8.1 Alternative B (Preferred Alternative)

There are no federally listed threatened or endangered, or BLM designated sensitive plant species within the project area (as determined by surveys). Cypripedium montanum, the mountain lady's slipper, which is being tracked and evaluated by the BLM and the Oregon Natural Heritage Program, was found to be relatively common in the project area, particularly in the shrub opening dominated by huckleberry. Neither action alternative would be likely to impact the species enough to warrant any future change in the species status.

4.8.2 Alternative C

Alternative C would cause greater short-term impacts to the species than Alternative B because there would be more large piles of material burned throughout the project area. Even in winter, burning large debris piles could sterilize the soil under the pile, killing the dormant plants. However, the cumulative impact of this alternative would not be likely to eliminate local populations of the species, and would not be likely to cause sufficient impact to warrant future change in the status of the species.

5.0 List of Preparers

Dale Ekman	Fuels Specialist
Dick Watson	Forester
Greg Miller	Wildlife Biologist
Todd Kuck	Hydrologist
Garth R. Ross	Fisheries Biologist
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Mary Oman	Archeologist
Rubel Vigil	Supervisory Natural Resource Specialist
Ted Davis	Supervisory Natural Resource Specialist
Randy Eyre	Environmental Coordinator, Fire

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7.0 List of Agencies and Persons Consulted

USDI Fish and Wildlife Service
USDC National Marine Fisheries Service